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Schubert

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[54] **GAS ABSORPTION ADDITIVES FOR ELECTROPHORETIC SUSPENSIONS**

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[58] **Field of Search** ..... 204/299 R, 180.1; 313/483, 358; 345/107

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,612,758	10/1971	Evans .	
4,093,534	6/1978	Carter et al.	204/299 R
4,203,106	5/1980	Dalisa et al. .	
4,298,448	11/1981	Muller et al. .	
4,408,202	10/1983	Fales .	
4,655,897	4/1987	DiSanto et al. .	
4,680,103	7/1987	Beilin Solomon I. et al. .	
4,732,830	3/1988	DiSanto et al. .	
4,889,603	12/1989	DiSanto et al.	204/299 R

OTHER PUBLICATIONS

"Studies of the Breakdown Process in Dielectric Fluids Using High Speed Photography", *Journal of Electronics*, vol. 7 Y. Yamada, S. Saramoto, and Y. Nakado 1979 pp. 155–168.

ASTM Test #D 2300–85, *Annual Book of ASTM Standards Feb. 1991 pp. 302–307.*

"Solubility of Gases in Liquids", *Viscosity and Diffusivity* J. H. Hilderbrand and R. H. Lamoreaux 1977 pp. 49–66.

Advanced Organic Chemistry, 3rd Ed., John Wiley & Sons J. March 1985 pp. 724–726.

Sterochemistry of Carbon Compounds, McGraw Hill, N.Y. E. L. Eliel 1962 pp. 298–304.

Physical Organic Chemistry, John Wiley & Sons, NY. N. S. Isaacs 1987 pp. 282–292.

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[57] **ABSTRACT**

An electrophoretic suspension prepared in accordance with the present invention comprises a dielectric fluid having suspended therein a plurality of pigment particles movable between the electrodes of an EPID device in response to an electric potential applied thereto and an effective amount of at least one additive for chemically absorbing at least one gas in the fluid. To absorb hydrogen gas in the dielectric fluid, a hydrogen absorbing additive is dispersed therein. The molecule of the hydrogen absorbing additive has an aromatic C/H ratio of 1/0.8 or less, and preferably between 1/0.67 and 1/0.75. To absorb chlorine gas in the dielectric fluid, an effective amount of an chlorine gas absorbing compound is also preferably added thereto. The chlorine gas absorbing additive comprises a molecule having at least one double bond and may be a sterically strained alkene such 5-ethylidene-2-norbornene.

19 Claims, 1 Drawing Sheet